JENNELLE (J. J.)

Treatment of Root Canals.

AN ESSAY

—BY—

J. J. JENNELLE,

CAIRO, ILLINOIS.

READ BEFORE THE

Southern Illinois Dental Society

AT CHESTER,

Tuesday, October 22, 1890.

PRINTED AT THE INSTANCE OF THE SOCIETY FOR CIRCULATION AMONG ITS MEMBERS.

BULLETIN PRINTING COMPANY,
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Treatment of Root Canals.

This subject is one of vital importance to the profession and is engaging the attention of all progressive practitioners, for the retention of pulpless teeth in the jaws for any considerable time depends entirely upon the successful treatment of these canals. It is threefold in its nature, embracing in itself, first: a thorough knowledge of diseased conditions. Second: a knowledge of the therapeutic effect of medicines used to prevent or cure, and last, but by no means least, a knowledge of what may be required in way of surgical operations in given cases and the requisite amount of skill to perform such operations. The subject is too extensive to cover the whole ground in one paper, so I shall confine myself briefly to the treatment of root canals as we find them in a majority of cases, viz:

Teeth that are abscessed with fistulous openings. Teeth that have blind abscesses, and teeth having live pulps exposed. Any of the six superior and ten inferior anterior teeth, abscessed with fistulea, may, in most cases, be treated and filled successfully at one sitting in the following manner: After applying the rubber dam in all cases where I can, I open well the cavity of decay, getting free access to the root canals. If the root is straight, canal large and round, I pass a small broach well down into the canal, stirring up the septic matter, using care to not let the broach pass through the apical foramen or force decomposed matter through. Then with "Dunn's" syringe and per-oxide of hydrogen, wash out all extraneous matter, continuing the use of the per-oxide at this time until all bubbling or foaming ceases, then with the syringe or cotton on a broach to act as a piston, force per-oxide and bi-chlor-

ide of mercury 1 to 1000 about equal parts, through the canals and fistulous tract. This being thoroughly done I follow up in same manner with oil cassia, Black's 1–2–3, or campho phenique. Now with shreds of cotton on broaches I wipe out canals, dry thoroughly with hot air syringe or any other method, moisten canal with eucalyptus and fill with chloro-percha and gutta-percha points. If I fail as above described to force the per-oxide through the fistulea, I fill the canal with per-oxide, form a piston with soft rubber in the pulp chamber, apply sudden pressure with any suitable instrument; failing in this, I pack the canal with cotton saturated with oil of cinnamon, seal up the cavity for four to six days, when as a usual thing I have no trouble to force an opening. The cinnamon being an insinuating medicine finds its way through all tissues remaining in the canal. I prefer this method to enlarging the apical foramen with broaches or drills, believing that the smaller I leave this opening the more successful my root filling will be. If canals are small, flat and tortuous as we often find them in the lower incisors, upper bi-cuspicls, buccal roots of upper molars and anterior roots of lower molars, the patience as well as the ingenuity of the operator is often put to the test to get them open and properly treated. I have used for this purpose reamers, drills, and all kindred instruments, but for the past few years have met with better success in the use of common Swiss broaches, (such as jewelers use) of various sizes and different grades of temper to suit the emergency. These broaches are four cornered and will do all the reaming necessary in any case. "Donaldson's Canal Cleansers," a round broach, are now made so fine they will enter almost

any canal. These broaches are barbed in such a manner they are well named "cleansers." The barbs extend all around and touch all sides of the canal at the same time (except very flat canals) so that when they are withdrawn they bring all debris with them. Each successive time I enter a canal with one of these cleansers I can go a little deeper, and by careful manipulation work my way to the apex of most any root. I find the frequent use of per-oxide a great help in opening up small canals, it not only goes ahead of the instrument, but serves to "boil out the dirt" when there is pus present. I do not wish to be understood as favoring the reaming of canals, but it is absolutely necessary in some cases, to get through to the apex. The canals in buccal roots of molars usually give more trouble than any others, and are sometimes very difficult to find. After the pulp chamber is opened I often use the syringe with hot air for some time, which has a mummifying effect on the tissues, when, with a strong exploring instrument I can easily find my way into what appears to be a constricted neck of these canals; usually this constriction amounts to simply a jugging at the pulp chamber. I ream out this choke and proceed as in case of any small canal. If the abscess is of long standing and bids fair to stubbornness I do not fill at once but inject fistulous tract with a saturated solution of chloride of zinc, pack the canal with cotton slightly moistened with oil of cassia and seal up the cavity with temporary stopping. If in one week the fistula does not show signs of closing, I repeat the dose, seal again and wait another week.

To bring about a radical cure it sometimes becomes necessary to cut or drill through the alveolar plate to

the apical space, bur off the end of the root and remove necrosed bone which is often found. This dead bone may be scraped out or dissolved with aromatic sulphuric acid on cotton packed into the sinus and allowed to remain a few hours. I find it a good plan to add a few drops of tincture of capsicum to the acid to give it a more stimulating effect. In chronic abscesses just before filling I think it a good plan to place in the canal a small quantity of iodoform moistened with oil of cinnamon. The one great point to be gained is a thoroughly aceptic condition of the canals and all contiguous parts; this being obtained the iodoform will retain these conditions as well as any remedy I have ever used. In cases of blind abscesses the treatment does not differ materially from that of fistulea. I apply the dam as before to the exclusion of the fluids of the mouth, disinfect the tooth and cavity of decay with per-oxide and bi-chloride 1–1000, equal parts, open carefully the pulp chamber, drain out the pus with per-oxide, continuing its use until foaming ceases, then pack the canal with cotton saturated with eugenol, oil of cassia or campho phenique, seal up the cavity for eight or ten days when usually the operation can be completed. In cases of dead putrescent pulps in confined chambers and canals, I make an artificial opening at once into the pulp chamber to give vent to gas and pus, drain as before with per-oxide, then with a sterilized broach I remove the pulp which I usually find well bleached by the per-oxide, treating and filling as before. I seldom find it necessary to force a fistulea in these cases.

When arsenious acid has been applied to destroy the pulp, the arsenic is left in the cavity twenty-four to

forty-eight hours. I then apply the dam and disinfect as before, wipe out the cavity with dialysed iron to neutralize the arsenic if any remains. If time is an important factor, if my patient is brave and the canal is of easy access, I do not hesitate to remove the pulp at this sitting after applying 10 per cent. cocaine for a few minutes; it can usually be done with very little pain. When bleeding ceases I dry thoroughly, wipe out canal with eucalyptus and fill. When time is *not* an important consideration, I open well the cavity of decay to the pulp chamber, apply tannin and alchohol and seal up the cavity for eight or ten days when the pulp can be removed with little or no pain. I treat, and fill as in previous case. I always apply the dam when I can, before opening a pulp canal, but there are cases where it is impossible to exclude the fluids of the mouth by its use, yet many teeth may be treated, filled and made useful members for a long time without being dam—d.

The country practitioner is often handicapped in the treatment of diseased teeth, owing to the fact that many of his patients live miles away and only come to town three or four times a year; in many of these cases he is prompted to practice immediate root filling, but unless the whole operation from beginning to end is carried out on a thoroughly antiseptic basis, the teeth as well as the dentist are pretty sure to come to grief. Immediate root filling may be all right in the hands of some dentists, but my advice to the average practitionis "don't be too quick." Wishing to present as much data on this subject as possible, aside from my own methods, I conceived the idea of writing to a number of prominent members of the profession in the west, who I knew would not be present on this occasion,

asking them to give me brief answers to the following questions:

1st. What is your method, including medicines used, of treating root canals prior to filling, that are abscessed with fistulous openings?

2d. Same as above, when blind abscesses prevail?

3d. Same, when arsenous acid has been used to destroy the pulp?

I submit the following by way of discussion, for it amounts to that, and think the various ideas well worthy your consideration.

Dr. Thos. L. Gilmer, Chicago, Ill.

Answer to Question 1:—Open the cavity into the pulp chamber sufficiently to give ample room for work and light, wash out chamber with warm water, using an ordinary mouth syringe. Apply on cotton, oil of cinnamon, close cavity either with sandarac or chloro-percha on cotton or gutta-percha temporary filling. The cinnamon being a diffusive medicament penetrates the remaining contents of the pulp canal and tubuli, rendering it aseptic. On the second or third day, the dam being previously applied to prevent the ingress of micro-organisms from the saliva, all particles are removed from the pulp canal, and if possible, eugenol is forced through the root into the diseased parts about its apex. The root is now perfectly dried by the use of the electric root canal dryer. The canal is then slightly moistened with oil of eucalyptus or oil of cajuput and the root filled either with chloro-percha and metal points or with gutta-percha points. The eucalyptus or oil of cajuput is used to facilitate the introduction of the chloro-percha or gutta percha, and to

secure a better adhesion between the filling material and the canal walls, also for the purpose of destroying any septic organisms that might be present at the last moment before the introduction of the root filling.

Answer to Question 2:—The treatment would be about the same as in No. 1, except I should make my stopping at the first sitting less tight, also should apply medicaments at least once or twice after first treatment, allowing them to remain in place several days before filling. In blind abscess would not aim to force the medicaments through the apical foramen, but attempt to cure by applying medicines which are easily diffused, and through them and active treatment aim to thoroughly remove the cause of irritation. In this as in other cases would depend much on absolute dryness.

Answer to Question 3:—Would remove the pulp, and if there was no hemorrhage, or if there was, when it had ceased, and the blood had been removed, would thoroughly wipe out the canal with 95 per cent. solution of carbolic acid, thereby rendering the contents of tubuli inert; then dry, and fill as before. Would fill the root and tooth, perhaps, at a second sitting, but would not hesitate to fill it at the time of the removal of pulp, unless there were other circumstances which prohibited. Have not spoken of surgical interference. If the case did not yield to treatment, would excise a part of the point of the root, or roots, as the case might be, removing at the same time any carious or necrosed bone surrounding the point of the root.

Dr. S. Finley Duncan, Joliet, Ill.

Answer to Question 1:—Roots having abcesses with fistulae: Get free opening into pulp chamber and canals. Cleanse canals of all contents. Force germi-

cide through canals and fistula. I generally use oil of cinnamon or eugenol for the purpose. Tereben carbolic acid, iodine dissolved in carbolic acid, or eucalyptol can be used in the same way. Dress the canals with paste of iodoform and ol. cin. or eugenol and seal up with gutta-percha. Usually one treatment is sufficient. If there is still a discharge of pus after a few days, I repeat the above treatment, changing the remedies. I do not fill until abscess is healed. *Never* fill immediately, or at the time of first treatment.

Answer to Question 2:—If blind abscess exists, open very carefully into the pulp chamber and canals with instruments that have been disinfected. Cleanse canals of septic material, being very careful not to force any through apical foramen. Dress canals loosely with fibers of cotton saturated with oil cinnamon, eugenol or tereben, or one of these can be combined with iodoform and used in same way. Before putting in dressing, sufficient time should be given for the pus to drain out through canal, as much as will. After dressing, seal up with gutta-percha. Puncture the gutta-percha, stopping with slender instrument to permit of escape of gasses or fluids that may be formed. Paint gums with equal parts tinctures iodine and aconite Rad and give calcium sulphide internally to prevent soreness and swelling that often follows opening into such cases, or to reduce soreness already present. Don't fill until all pathological symptoms have subsided. If there is an enlargement of gum over root, lance it freely.

Answer to Question 3:—If arsenious acid has been used to devitalize pulp, and the dead pulp has not remained in canals long enough to become putrescent, it may be removed and the canals dried, just moisten

with eucalyptus or tereben and filled without further treatment, using gutta-percha solution, and solid cones where it is possible. Do not think it necessary to use dialysed iron or anything else to neutralize the arsenic, unless a very large quantity has been used. Even then I question whether it is necessary, if the cleansing process is thoroughly performed after devitalizing. I prefer to wait generally about ten days before removing the pulp, as it can then be done more easily and with less pain to the patient.

Dr. C. R. E Koch, Chicago, Ill.

Answer to Question 1:—Root canals with fistulous openings, after cleansing from all debris, I would ordinarily inject with 95 per cent. carbolic acid, so that it penetrates the fistulous openings. I have used Per-oxide of Hydrogen for same purpose, but not with as uniformly happy results. After ascertaining that my abscess has been completely laved throughout its course, I should in most cases fill root or roots at once. I used chloro-percha and gutta-percha points.

Answer to Question 2:—In case of blind abscess, I should first cleanse cavity and remove carefully from root canal all extraneous substances, being careful not to pack such closer to apex, but to make an unobstructed vent. I should bathe the root with per-oxide or alcohol, or any germicide, except carbolic acid, repeating this at such intervals as may be necessary. If, after reasonable time, the abscess does not subside, so as to allow of thorough cleansing of the root and filling, as in case of No. 1, I should force it to an abscess with a fistulous opening, by changing the chronic to an acute condition; making the fistulous by means of lan-

cet or by trephine, and then treat substantially as in No. 1.

Answer to Question 3:—After using arsenious acid and *removing* the pulp in a healthy, vigorous patient, I generally wash the canals with Black's 1, 2, 3, to which I add an equal part of Fleming's Tr. of aconite Rad. This, after dam is in position, I introduce, either by means of pledget of cotton, or with a drop syringe (*Dunn's*); allow this to remain for a few minutes. I dry the cavity (*roots*) and fill with gutta-percha, and sometimes the crown with gold or amalgam at same sitting. In frail patients, I should leave the dressing of 1, 2, 3, and aconite for several days, and then make two operations of filling roots and cavity.

Edmund Noyes, Chicago, Ill.

Answer to Question 1:— Abscesses with fistulous openings: The root canal should first be cleansed and disinfected, and then there is usually no great difficulty in forcing medicines through the canals till it appears at the outlet of the fistula. For this purpose I usually use first the per. oxide of hydrogen, sometimes adding a single drop of oil cinnamon or cassia, and shaking it into an emulsion; but the cinnamon or cassia is quite irritating and sometimes painful, and if the abscess is acute the pain is usually severe, so in that case I leave it out. In any case the 1, 2, 3, (carbolic acid, cinnamon and winter green), is about as effective and usually much less painful. After per-oxide, (either with or without the oils) I usually force the 1, 2, 3, full strength, through the fistula, carry threads of cotton with that or cinnamon into the root canals, and stop the cavity tightly with gutta-percha. If I cannot get medicines through the foramen to cleanse the

abscess, I almost always prefer to do it, as best I can, through the fistula, rather than enlarge the foramen, which I regard as often a difficult and dangerous operation, and troublesome to take care of and fill afterwards. There are probably a good many other things that would satisfactorily replace the medicines named, but think that it is not very often necessary to destroy any tissue by the use of escharotics. If any abscess is complicated, caries or necrosis of the alveolus or maxilla, a different line of treatment may be necessary, and if a cure can be obtained at all by the line of treatment just described, it will be a persistent and regular continuance, keeping the abscess under control of the antiseptics without producing sufficient irritation to prevent the growth of new tissue and dissolving and absorption by the vital process. The treatment of blind abscesses varies from fistulous ones in methods and details of treatment, rather than in the principles involved or the objects to be obtained. Far more care is required in the first treatment, to avoid poisoning the abscess by forcing the foul contents of the root canals through the foramen, though if the abscess is active enough to show a free discharge through the tooth, but little trouble need be apprehended from that source. Suction by the tongue, or any other means that can be made available, is often very useful in evacuating blind abscesses. Of course it is very difficult to force much medicine into them, and we usually depend upon the slow diffusion of an abundant quantity placed in the canals by loose threads of cotton, the cavity being sealed to prevent its escape. If there is much discharge, it will have to be opened and drained, often to prevent pain or irritation by its accumulation, and it

is usually wise the first time to use cotton and sandarac in such a way that the patient can remove it easily, but the dressing should be renewed as soon as possible after the evacuation of the abscess, and the subsidence of whatever pain or acute irritation may have been caused by the first treatment, and it should be tightly stopped over the dressing as soon as it will tolerate it, and kept so to the end. If pulps are destroyed by arsenious acid, the cavities should be kept tightly stopped from beginning to end, and access of fluids of the mouth should never be permitted to the root canals if it can possibly be avoided. I like best to leave arsenic 48 hours, then open the pulp chamber somewhat freely and apply tannin and glycerine for a week, though sometimes the pulp may be readily removed at this sitting (48 hours after the arsenic application.) After the tannin and glycerine has been in a week the pulp may *usually* be removed with little pain, or none at all, and there is often no very serious objection to filling the roots at the same sitting, though it is often much preferable to do so at a subsequent sitting. After any convenient interval it matters little whether a few days or weeks, if the canals are under the control of antiseptics and the cavities tightly stopped with gutta-percha, cement or something that will effectually close them against leakage from the mouth.

Dr. L. C. Ingersoll, Keokuk, Iowa.

Answer to Question 1:—"Blind Abscesses," so called: I prefer to call it incipient abscess, as the term "blind abscess" is an expression of the ignorance of the profession in early days concerning the nature of the disease. My observation and experience convinces me that an incipient abscess will in the ma-

jority of cases, become a fully developed abscess within the term of two years. Observe—I say in the majority of cases, and that too in spite of the best root filling now known to the profession, if root filling is relied upon as the chief remedy for the condition. Unless the disease is first cured before the root filling, it is quite likely to persist until full development of abscess supervenes. I do not think it wise to trust to filling as a cure of abscess in any of its progressive stages. The metamorphosis of tissue may be less rapid, and fully developed abscess be less pronounced, but I have but little faith in a complete cure by root filling as a primary means. In case, therefore, of an incipient abscess, I try to secure the earliest possible developments of abscess and the discharge of pus through a sinus in the gums. I avoid the use of all antiseptics, as such medicines tend to arrest pus formation, although in this class of cases usually failing to *wholly* arrest it. I close the cavity in the root tightly as possible with any temporary stopping. If pain is excited, I remove the stopping for a day to give vent to confined gases. I stop again and recommend dry heat upon the face, and wine of opium and capsicum, equal parts, applied to the gum to relieve the pain. If the pain is very severe, I open, if possible, the apical foramen with the finest broach and apply a mild antiseptic. Whenever by touch of the finger upon the overlying gum a fluctuation is felt, indicating the presence of confined pus, I lance the gum freely at a point adapted to secure the most complete drainage. I would then force through the root warm water to wash out all the pus; would end the treatment by using carbolized water or wood creosote, and filling the cavity of the tooth with cotton

and shellac varnish. I would dismiss my patient for three days, then if no signs of pus are manifested, I would fill by such method as seems best adapted to close completely the apical foramen.

Answer to Question 2:—If the abscess is developed wholly by natural means, forming a fistulous canal, and a sinus in the gum, I proceed upon the fact that, in the process of development, abnormal tissue has been formed which must be gotten rid of before a cure can be effected, I do not trust to the oft repeated, but deceptive, statement that "if you remove the cause of disease nature will perform the cure." While in some cases this is true, I prefer the sure and quicker way of removing the abnormal tissue, the abscess sack and the fistula by artificial means. I first wash out the pus by forcing warm water through the canal and the fistula, then I apply pure carbolic acid in the same manner as the water. The treatment in this case is not successful, unless you can see the whitened coagulum formed by the carbolic acid forced through the sinus on the gum. One such treatment in case of a recently formed abscess is often sufficient. Two or three treatments may be needed in abscesses of longer standing. To force medicaments through the roots, I use soft rubber forced into the cavity or opening into the roots with orange wood fitted to the opening. In case of chronic abscess, not involving other tissues, I would alternate carb. ac. with creosote and tinct. of iodine, equal parts.

Answer to Question 3:—If I devitalize the pulp by use of arsenic, on removal of the arsenic, I use dialysed iron to neutralize the arsenic that remains in the cavity; its action is so instantaneous that but a few

seconds of time are required. I then leave the cavity open for a week. If soreness or tenderness of the tooth is felt before the expiration of that time, my patient is advised to return. After removing the arsenic, I use no antiseptic of any kind, because I wish to secure the decomposition of the pulp tissue as soon as possible. If the tooth is on the lower jaw, loose cotton without medicament should be put in the cavity, and without pressure, and occasionally changed by the patient. At the next sitting, I remove what I can of the dead tissue; it may be possible to remove all the body of the pulp from the six anterior teeth. But I always assume that from the bicuspids and molars especially, the pulp processes remain in the substance of the dentine, as well as a considerable portion of dead tissue in the extreme portion of the root canals. I do not believe there is any mechanical means by which all the pulp tissue can be removed from the flat roots of the molars and bicuspids. The remaining portions must therefore be removed slowly by decomposition. In the meantime the case must not be left to itself, but watched and guarded against the septic matter of the decomposing tissue affecting the peridental membrane. It is much less likely to do this if the cavity is kept freely open, than if the gases generated are confined by any firm stopping. In case any tenderness occurs mild stimulating and antiseptic treatment should be given in washing out the canal of the root. From two to four weeks are required for the decomposition of these pulp fibers. Four weeks are better than two. Decomposition in the long run is better than *pickling or mummifying.*

G. V. Black, Jacksonville, Ill.

QUESTION 1:—What is your method of treating root canals, including medicines used? Also, when abscessed with fistulous openings?

ANSWER TO QUESTION 1:—For the first of these we will suppose that a patient comes for any necessary operations, and I find one or more dead pulps in teeth that have given no pain, a kind of case that is frequent enough. When this fact is determined, put on the rubber dam. Disinfect the crown of the tooth and the cavity by first cleansing same, and then washing well with the 1, 2, 3 mixture (carbolic acid, oil cassia and oil winter green.) I use this on a swab of cotton, also cotton wisps drawn between the teeth. Open into root canals and get good access before trying to enter them in all cases. If they are empty put in a little cotton saturated with 1, 2, 3 and seal up cavity with gutta-percha, having moistened walls of cavity with oil of eucalyptus to make the gutta-percha cohere. If canals contain debris, moisten broach in 1, 2, 3, and remove main bulk, being careful not to reach apical foramen, and careful not to punch anything through, apply 1, 2, 3, on cotton and seal up as before. In either case, discharge the patient for one week, with instructions to report sooner if any trouble. In case there is fistulous opening apply dam as before and disinfect. Open into canals and clean thoroughly, getting good opening through apical foramen if possible, but do not drill through. Wash with sulphuric ether, pumping it through with cotton on broach where I must, but driving it through with a syringe where I can; sometimes use per-oxide of hydrogen, instead of sulphuric ether. In case I cannot get through apical foramen, I make

the best possible cleaning of canals, apply 1, 2, 3 in canals on cotton, seal up, discharge the patient for a week to wait development. I do this also with cases in which I do get through and wash out.

Answer to Question 2:—In case of blind abscess, when I find pus in canals and no fistulous opening, I call it blind abscess, provided it is not acute. Before this is learned I have applied the dam and have disinfected. (The dam is always applied before opening into a pulp chamber.) Clean the canals thoroughly and drain away all the pus possible. When there seems to be much pus I pump in per-oxide of hydrogen first, or simply wash canal with ether. In these cases I often pump in pure oil of cassia, using cotton on a broach, but sometimes use carbolic acid 95 per cent., and again the 1, 2, 3. Then seal up cavity with gutta-percha for a week, giving careful instructions to patient to report any time if there is trouble. In all of these cases, if all has gone well, I fill the canals at the next sitting, put on dam an disinfect before removing gutta-percha.

Answer to Question 3:—In case arsenious acid has been used to destroy pulp. 1st: When pulp is drawn away whole, moisten canals with eucalyptus and fill immediately. The dam was on when the arsenic was applied, and the arsenic sealed in with gutta-percha. The dam was on and the tooth and surroundings disinfected before the gutta-percha was removed. 2d: In case the pulp breaks up into shreds, making it difficult and doubtful about getting canals well cleaned, seal up for a week, leaving cotton with 1, 2, 3 in canal. Then remove this, dam on, surroundings disinfected, and fill root. The cotton generally

brings away what debris there may have been left in canal. In any case in which a tooth has become sore to the touch, while arsenious acid is in cavity, the filling of root is delayed, even if the pulp comes out clean. I think it a good rule never to fill a root canal while the tooth is sore. This is what may be termed my routine treatment. In all these cases I fill the root at the second sitting, if all has gone well. When pain has arisen, or discharge of pus continues, further time and treatment is required, and the case gets out of the routine method, and must be treated according to the conditions. Sometimes a simple change of dressing and another week's probation is all that is wanted. Sometimes the medication is forced. Pure oil of cassia may be found necessary in the abscess cavity to disinfect and arouse some irritation or excitant effect. Or I may use 95 per cent. carbolic acid, forcing it through the fistula. This keeps the fistulas open longer, and makes them larger for a time, giving better drainage. Or, again, when some very mild measures will seem sufficient, but something further is needed, I will force eucalyptus into the abscess after washing with ether or per-oxide of hydrogen. Cases come now and then in which I make a wide cut from the outside to make free drainage. In fact these cases that don't get well readily lead to great variety of treatment to meet the special conditions.

W. T. Magill, Rock Island, Ills.

My method of treating root canals during the past five years is very plain and simple.

Answer to Question 1:—Where there is a fistulous opening. My general practice is to cleanse with tepid water as thoroughly as possible, then apply rub-

ber dam, dry the cavity and canals, wash with per-oxide of hydrogen, dry again, then apply on cotton (with small piano wire smooth broach) some of the essential oils that will not coagulate albumen, fill up the cavity with Fowler's or Gilbert's, stopping for three days, and if necessary repeat. Except in aggravated cases, the above treatment proves sufficient. A favorite dressing I use: Oil cassia one part, oil gaultheria two parts, eugenol three parts. (I think Dr. Newkirk the author of above combination.)

Answer to Question 2:—When roots have not fistulous openings, treatment virtually same as above, except greater care is necessasy in cleansing and applying medicines, so as not to force air or debris beyond the apex of root. And I might add filling materials.

Answer to Question 3:—When arsenious acid has been used, remove devitalized pulp, (be sure to get it all out), treat same as above, fill at same sitting. For drying out nerve canals, I use hot air syringe, hot wire, and dry cotton on broach. I take time to be thorough with every part of the operation, and then feel that success will surely follow. It has been so long since I have had any after trouble with this class of cases, that I forget when it was. I use generally piano wire broaches for cleansing out cavities or canals, and in baccal canals, and other small ones, I get the wire off of guitar strings; it will enter almost any cavity, where a hair will enter. In especially aggravated cases of fistulous openings of long standing, I sometimes use aromatic sulphuric acid, and other powerful remedies. I hope that you may find some crumbs among these few notes that will be of service to you and a help to some one else.

E. C. Stone, Galesburg, Ills.

Answer to Question 1:—I cleanse canals, removing all diseased bone, pump carbolic acid or creosote through until it appears at external opening, then dry and fill at once.

Answer to Question 2:—Cleanse root canals, disinfect with corrosive sub. 1 to 1000, then dry canals and open through point of root, work oil of cloves or cassia through into abscess, and seal cavity for two or three days. If no soreness, follow that with Black's 1, 2, 3, and fill.

Answer to Question 3:—Remove pulp, treat with Black's 1, 2, 3, and fill at once.

James W. Comany, Mount Carroll, Ills.

Answer to Question 1:—Remove all decayed matter with broach and cotton, treat with resorcin and eugenol (10 grains resorcin, ½ oz. eugenol), close up tight; if with fistulous openiag, loose; if blind abscess, this to remain three days, remove and treat with same, closed in tight in either case, wait three days, if no trouble, fill with gutta-percha dissolved in chloroform, using gutta-percha points, and cover same with oxichloride of zinc. The above answers questions 1 and 2.

Answer to Question 3:—Apply arsenious acid, say on the first day. Third day remove, treat pulp with solution of tannin in alcohol, let remain until the 9th day, when pulp can be removed very easily and nicely, fill immediately with gutta-percha solution and points and ox. ch. zinc. I do not spend time pumping medicines through fistulous openings, because I do not fill immediately any how, except as above.

G. H. Cushing, Chicago, Ills.

Answer to Question 1:—Tooth with fistulous opening: Clean pulp chamber and canals thoroughly after dressing with oil of cassia, and then force through the fistula, if possible, oil of cassia or creosote and iodine or eucalyptus. Leave this sealed up for two or three days, then force it in once again, dry out and fill roots.

Answer to Question 2:—Tooth with blind abscess: Open and clean out pulp chamber; be very careful not to pass any instrument into the canal to force decomposed contents toward or through the foramen, then dress with oil of cassia, seal up and let remain for three or four days. Then open and thoroughly cleanse canals, being sure that your instruments are thoroughly disinfected. Dress again with oil of cassia, forcing it into canals and rest again for two or three days, then use sat. sol. of chloride zinc, and when satisfied that there is no discharge, and everything is aseptic, fill roots with gutta-percha, being sure to pack thoroughly to end of roots.

Answer to Question 3:—When you have devitalized the tooth after thorough removal of pulp in canal, pack with cotton and oil cassia, leave till soreness disappears, if there is any, say three or four days, then saturate with sol. chl. zinc, dry roots and fill with gutta-percha.

Garrett Newkirk, Chicago, Ills.

Answer to Question 1:—I inject through root and fistula at two or three sittings, usually H2 O2. Rarely, when the production of pus does not cease, one injection of creosote. When time has elapsed, say three or four days, sufficient for thorough cleansing and disin-

fection of the canal in question, and no pus at the apex, I fill without fear of any trouble. Treatment of canal consists in wiping with cotton, delicately wound on a delicate broach, with cloroform, then with oil of cassia, a twist of cotton saturated with the last named, sometimes with a little tinct. iodine, at the point, is left in root and pulp chamber in intervals between visits. The fistula will close permanently almost without exception.

Answer to Question 2:—Secure a free opening through the root with smooth broach, *no drills* or *reamers*. Use several injections H2 O2 carefully at the first sitting. Leave root filled with same as above. Test from day to day (or two days apart) till no pus remains, and there is little if any serious (watery) discharge, then fill.

Answer to Question 3:—I do not attempt to remove pulp filaments from roots till time has elapsed for separation of dead and living tissue at the apices; as a rule this will be in a week or less, but with large pulps sometimes much longer. A favorite dressing in cavity or main pulp chamber is of ol. cassia or cloves with tannic acid and glycerine. This mummifies the threads and prevents infection almost any length of time, safely for weeks. I do not hesitate in such cases, when the pulp comes out whole, but shriveled, to fill at once, always of course aseptically.

L. L. Davis, Chicago, Ills.

Answer to Question 1:—I have to suppose certain conditions in a given case; for instance patient presents with adontalgia first thing in the morning; has been suffering slightly for the past few days, but pain has reached the culminating point during the night; tooth

so sore that the slightest pressure is excruciating. I find on examination it is necessary to use the drill, so proceed to ligate the tooth with thread so that it may be held firmly in the opposite direction to the pressure of the drill. When the pulp cavity has been opened and pus removed send the patient away till the next day, at which sitting the opening is enlarged, root canals thoroughly cleansed with per-oxide of hydrogen and dressed with eucalyptus, the cavity sealed with Fowler's sticky compound or a pledget of cotton saturated with a solution of gutta-percha in chloroform. I may say here that when I seal medicaments within a cavity, these two materials are the ones I use. The cotton and chloro-percha especially in proximal cavities, where the adjacent tooth has crowded into the cavity of the tooth being treated, or where I wish to get more space than presents. Four days later a similar cleansing, and if there is still a discharge I substitute a paste of iodoform and oil of cinnamon for the eucalyptus, and seal. Four days later I expect to fill the roots. If there is a prospect of relief by using the lancet instead of drilling at the first presentation of the case I immediately use it, and then we have the condition necessary to supply a case for your second question. In cleansing I hear so many dentists say they "always use the rubber dam." But I suspect that, like myself, they find cases where they find an "exception." I do not *always apply the rubber dam*, and believe it not always necessary, especially at the first sitting, and often treat and fill a tooth without using the dam. In cleansing a cavity of debris preparatory to the root cleansing, I use warm water containing a solution of hydro-napthol. This will disinfect the mouth as well as the cavity. Where

the abscess is chronic and obstinate I have often removed unhealthy granulations by forcing through the root canal and fistulous openings, a solution of iodine crystals in creosote, following at another sitting with some of the more bland medicaments, mainly eucalyptol on account of it being so volatile. I do not fill the roots of teeth with fistulous openings at the first sitting, (I am not a crank on "immediate root filling"), and do not use the iodoform paste in their treatment on account of the unpleasant odor, which would constantly be present and *palpable* to the patient. I occasionally use the oil of cassia, alternating with eucalyptol, but between that the more volatile the oil the better the effect on the soft tissues, for while producing local irritation by contact of the oil itself, the vapors have a sedative effect.

Answer to Question 3:—The third question prescribes the case. In applying the arsenious paste, I emphatically say, *use the rubber dam*, and be *sure* to apply the paste to the pulp tissue. After twenty-four hours remove and cleanse, dress with pledget of cotton saturated with dialysed iron, which dressing change next day and seal in cavity; after cleansing with aquaious solution of hydronapthol, or solution of tannin a week or ten days later, remove pulp, cleanse with peroxide, and fill. If there is any hemorrhage persistent, I use the iodoform paste, and at the following sitting (four days later) fill roots. This, Doctor, is, briefly, my every day practice. I have not supposed an extraordinary case, but the usual ones. In long standing cases, I have used the iodide of zinc in solution, at times, or a "shotgun" formula of Dr. Harân's, as follows: R-Eucalyptol ½ drm., Oil Gaultheria ½ drm.,

Oil Tereben ½ drm., Carbolic Acid (Crystals), 1 drm., Alcohol, (95 per cent.) 1 drm., Camphor ½ drm. Then I have a formula of my own, that I use in children's mouths, especially when it is impossible to excavate or probe into the pulp cavity, also in cases where the patient comes with threatening trouble from a badly decayed tooth, with dead pulp, and there is not time enough at disposal to thoroughly open. It is as follows: R–Carbolic Acid (Crystals) 1 drm., Oil Cassia 1 drm., Alcohol 2 drm., Glycerine 1 oz. I have occasionally used a solution of champhor and obtained good results. I might mention a few others of the many bottles that litter my shelves, but those generally used have been spoken of.

R. N. Lawrence, Lincoln, Ills.

Answer to Question 1:—Treatment of root canals where an abscess with fistula exists: Open up canal, remove all contents, cleanse with per-oxide, force it through the fistula, next use in same manner per-ox. and bi-chloride (1-1000) equal parts, next paliative dressing on floss silk (loose) of oil cassia and eugenol or guacol.

Answer to Question 2:—Blind abscess poultice with roasted raisin, produce a fistula and treat as No. 1, or treat for weeks through canal, using non coagulants.

Answer to Question 3:—Root canals when pulp has been destroyed by arsenic: When the entire pulp has been removed, dry canal with root dryer, use a coagulant, chloride of zinc, fill with gutta-percha, etc. The above is my method in short form.

J. N. Crouse, Chicago, Ills.

Following is my method of treating and filling root

canals. After removing carefully, not with drill, the loose decayed matter in root, I inject phenol sodique through it, and out through the fistulous opening, to make sure that the passage way is clear. I do this by fitting a piece of soft india rubber to cavity, so by the use of a blunt instrument and with a short, quick motion, the medicine can be forced out the same as with a piston to syringe, only more effectually. When sure passage way is open through fistulous opening, inject in same way carbolic acid, then close cavity with temporary filling, letting temporary filling remain till fistulous opening is closed. In a month's time if case does not get well, I give it an injection of aromatic sulphuric acid. When fistulous opening is closed, I cleanse and use per-oxide of hydrogen in one of "Dunn's" syringes. Then pass drill down through end of root in order to enlarge opening, so that puss can pass out freely, repeating dose of per-oxide of hydrogen, until there is no more foaming or boiling from decomposing pus, after which I use either aromatic sulphuric acid or carbolic acid through root in sufficient quantity to break up sack. In all cases where pulp is dead, and there is no fistulous opening and indication of sluggish abscess, I force instrument through fistula, making it bleed if possible, thus getting a fresh flow of blood, and breaking up fermentative process at end of root. When the pulp is removed after the use of arsenic, I always wipe out cavity with carbolic acid and fill in all cases with oxychloride of zinc, carry the *oxychloride to end of root* by means of gold wrapped in such a way, on a small smooth instrument, that when instrument is removed the gold will remain: when opening has been enlarged am very careful not to force gold out through

end. This, I think, is giving you briefly my method of general treatment. There is one point I wish to *emphasize*, that is, to be sure to use rubber fully as large as cavity, and force medicine out through fistulous opening.

A. W. Harlan, Chicago, Ills.

Answer to Question 1:—Open pulp chamber, remove debris, wash the root with equal parts hydrogen per-oxide and 1-1000 bi-chloride of mercury, inject eugenol through the root until it comes out at the fistulous opening, and fill the root at once with gutta-percha. If fistulous has been of more than two years standing, I seal cotton moistened with myrtol, in the root for two weeks, and then reinject if necessary, and fill.

Answer to Question 2:—Open the chamber, with rubber dam on the tooth, wash the tooth with per-oxide, but do not introduce an instrument into the root, place a pillet of cotton in the chamber wet with ol. cassia and myrtol, leave it about four days, and then remove the dressing, which of course was covered with soft gutta-percha, and remove the contents of the canal. Completely drain the abscess by repeated wiping of per-oxide and bi-chloride, then place a strand of cotton, wet with cassia and myrtol in the root about one-half as long as the canal, seal without pressure, and push a hole through the gutta-percha; at the end of ten days I see the patient, and if the case is favorable, fill the root; if not, repeat the treatment for another ten days, when it will be ready for the root filling; rubber dam always in place, no water or other fluid in the tooth from beginning to finish, that you do not place there yourself. Circumstances may vary this, but the above is the general rule.

J. Frank Mariner, Chicago, Ills.

Answer to Question 1:—It is very doubtful about my giving you the desired information, as 'tis well known that I differ materially with perhaps a large majority of operators on this subject. I have followed every treatment, including medicines, that I ever heard of, have in fact been a crank on treating pulpless teeth. Wherever fermentation and putrefaction exist will be found micro organism, and to remove all septic matter we need something that will destroy bacteria; two remedies accomplish this as surely and quickly as will half a dozen or more; (they are bi-chloride of mercury and per-oxide of hydrogen.) I use, to the exclusion of nearly every other remedy, bi-chloride of mercury, it being a powerful germicide, even in a very weak solution, so weak that it will not injure the most delicate tissues. If I have any fear of re-formation of "microbes" would use iodoform in combination with chloro-percha, but find it seldom called for. Now with broach, proper size, wrapped with a few shreds of cotton, wet in a solution of bi-chloride, enter canal as far as you can go without force, remove, and with clean broach and cotton enter a second time, going a little further than before, repeat this until you reach the apex and you will have canal free from septic matter and ready to fill, which I do at once, with or without a fistula. In case of blind abscess, you may have some trouble to get the canal dry, and here comes in our second remedy, viz: Per-oxide of hydrogen, which will expel every particle of pus; it will go where no instrument can possibly go. Now with hot air and cotton, dry and fill at once; and, if necessary, make fistulous opening through gum and alveolus. Where

arsenious acid has been used to devitalize pulp, same as above. Now after trying everything else, I have got down to just about the above, as near as I can tell it. And I believe that 97 per cent. of all cases can be handled successfully, treated as above. Why treat a tooth from one to three weeks, when the same can be done in an hour at the farthest? The great Prof. Ottofy says, because it don't pay so well, and I guess that's about it. I could go on and give a much greater method, but as useless as the fifth wheel to a cart. And I don't suppose this will be of any use to you. I believe immediate root filling to be the only rational treatment for a pulpless tooth in nearly every instance; sometimes, perhaps, you will have a little soreness, which will pass away in a day or two; in such cases bathe gum with sol. aconite and alcohol, equal parts. While I am aware I see you read this, and with contemptuous curl of the lips consign it to the waste basket, I must say that my practice with pulpless teeth was never satisfactory until I adopted the above practice. If you have never tried it, and conclude to do so, be thorough, and don't expect trouble; if you do you may get it, for a man in nearly every case finds what he is looking for.